# CONCRETE DELIVERY PROFESSIONAL (CDP) STUDY GUIDE MODULE II - ENVIRONMENTAL



# Introduction

An important goal of the ready mixed concrete industry is to be a responsible corporate citizen and neighbour. Environmental conservation is a vital part of those efforts.

Many people have an impression of the concrete industry as being dirty and noisy. Things like dirty plants or trucks, runoff water polluting streams or rivers, and noisy or dusty operations can reinforce this image. We can change this image if the production and delivery of ready mixed concrete is done in an environmentally friendly way. The Concrete Delivery Professional can play an important role in showing others that the concrete industry cares about the environment.

Most of the information in this module is presented to increase the CDP's knowledge about environmental issues faced by the ready mixed concrete industry. It provides background information so that the CDP can better understand the specific things he or she can do to minimize environmental impact.

#### The objectives of this module include:

- Creating a better understanding of how ready mixed concrete operations can affect the environment.
- Create an awareness of specific environmental regulations that affect the industry.
- Show the best practices that ready mixed concrete operations can use to minimize environmental impact.
- Outline specific tasks that the CDP can perform to assist in environmental compliance and improvement.

To learn more about the information presented in this module, please see the CRMCA Environmental Practices for the Ready Mixed Concrete Industry - 2004. Also, a glossary of terms can be found at the end of the manual.





**Chapter Objectives:** 

#### After studying this chapter, the CDP candidate should be able to:

- Understand the importance of industry environmental responsibility and the role of the Concrete Delivery Professional;
- Be aware of environmental regulations that affect the CDP;
- Understand the concept of environmental best management practices (BMPs) and how the CDP can use them;
- Understand the concept of pH and how Portland cement and acids affect pH levels.

#### Why is Environmental Awareness Important?

Everyone today is more aware of the effect that our civilization has on the environment. Pollution and its effects on the quality of our air, water and land is in the media almost daily. A great deal of attention has been focused on industry as the major polluters, but individuals have a great effect on the environment every day by how they live and work.

We all impact the environment through automobile exhaust, or creating garbage that has to be land filled. If all the environmental impact made by individuals is added up, it is vastly more than what is created by industry or manufacturing. People do not realize that the small amount of pollution they create will add up to major environmental consequences.

Environmental conservation is just like safety - it is an attitude and a way of life. Because each individual can have an effect on the environment, **everyone** must practice good environmental conservation at home and at work.



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The Environment and the Ready Mixed Concrete Industry

Like most other industries, part of the future success of the ready mixed concrete industry depends on operating in an environmentally friendly manner. Our environmental action or inaction will have a long-term effect on the image and profitability of the industry as a whole. This requires ready mixed concrete producers and their employees to be constantly aware of the impact their operations have on the environment, and not just thought about when a problem or polluting event occurs.

Even the smallest oil spill or discharge of concrete wash water can have an environmental impact. In order to be environmentally responsible, the concrete producer must look at their entire operation and its effect on the environment. Producers must take the approach that any spill or release of pollutant that could potentially affect the natural environment should be prevented wherever possible. Any spill or release that occurs must be promptly and aggressively controlled.

Concrete plants and ready mixed concrete operations must be managed responsibly to comply with applicable regulations, to be good neighbours in the community and to promote a positive image for the concrete industry (See Figure 2-1).

There are also financial benefits to sound environmental operating practices, such as improved efficiency in material use through recycling, reduced waste disposal costs, and increased profits by selling recycled materials (See Figure 2-2).



Figure 2-1: NRMCA Environmental Excellence Award winner, Central Concrete Supermix, West Hollywood, Florida.



The CDP is an important part of a ready mixed concrete producer's environmental compliance efforts. The CDP affects environmental compliance mostly in the areas of water discharge, management of solids such as returned concrete, and fueling practices.



#### **Environmental Regulations**

Ready mixed concrete producers must comply with many different federal, state and local environmental legislation. Violation of these regulations can have a severe impact on the individual responsible, the company, and its employees. Fines in the hundreds of thousands of dollars can be assessed for environmental violations, as well as the cost to cleanup any hazards created. In severe cases, jail terms can be imposed.

The federal agency responsible for environmental issues and regulations across the country is Environment Canada (EC). However, in Canada, provincial governments are primarily responsible for environmental protection and enforcement. The exception is fisheries habitats (inland and coastal waters) which are regulated by the federal Department of Fisheries and Oceans (DFO) and the Canadian Fisheries Act.

Depending on the plant location, there may be other regional and/or municipal regulations that a ready mixed concrete producer must comply with, which can vary among plant locations. Here is a list of some of the laws that affect ready mixed concrete producers:

Regulation	What it covers
Canadian Environmental Protection Act	Federal law that establishes the framework for environmental regulations in Canada. The goal of the Act is to contribute to sustainable development through pollution prevention and protect the environment, human life and health from the risks associated with toxic substances.
Canadian Fisheries Act	Federal law that protects fish habitat from deleterious substances and potential adverse impacts.
Provincial Environmental Protection Acts	

Other agencies that affect environmental compliance are the federal Ministry of Human Resources and Skills Development Canada (HRDSC). HRDSC regulates environmental impact on employees by creating standards for exposure to noise, air quality, and potentially hazardous chemicals through the Canada Labour Code Part II. Occupational health and safety including environmental exposure and impacts are also regulated provincially. Each provincial and territorial government also enforces labour regulations.

The various provincial occupational health and safety regulations require employers to provide training of employees on how to safely work with any potentially harmful chemicals or materials in the workplace. This includes the use of Material Safety Data Sheets (MSDS). An MSDS is required for any potentially harmful or hazardous chemicals or materials used by an employee. These must be available for employees to review at any time, and lists information on the physical and chemical makeup of workplace materials. The MSDS lists first aid information for use if an employee is improperly exposed to the product. It also lists what effect the substance will have on the environment if released and what steps can be taken. It is expected the new Globally Harmonized System (GHS) of Classification and Labeling of Chemicals will be replacing



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#### **Environmental Regulations** continued

the MSDS system soon because inconsistency in MSDS formats has made it difficult for users to find and understand the information they need to work safely. The GHS requires the use of a standardized 16-section SDS with minimum information requirements for each section. The SDS must provide the GHS hazard classification for the product, the GHS label text, and information on any other hazards. The GHS label text consists of standardized pictograms, signal words, hazard statements

Products are subject to additional regulation by Environment Canada, provincial environment ministries or other regulatory agencies, if they are used or stored in larger quantities.

#### **Environmental Management Plans**

All ready mixed concrete facilities should have environmental management plans. These plans ensure that all the applicable environmental regulations are complied with. The plan is normally written by company officials and distributed to all employees, so that they know the policies and procedures required for environmental compliance. Since all plants and facilities are different, there is no one environmental management plan that fits all.

### Environmental Management Plans must be customized for the facility and consider such things as:

- Area surrounding plant is it urban, rural, or industrial?
- Size and shape of plant site;
- Proximity to streams or other bodies of water, neighbours, parkland;
- Special laws of province, county or town where the plant is located;
- Soil composition;
- Visibility of plant from streets, waterways, etc.

Best Management Practices (BMPs) are used to develop environmental compliance based on the best possible method of controlling environmental hazards at that location. They are often commonsense methods of dealing with the daily ready mixed concrete operation. A CDP should be familiar with each plant's environmental BMPs.

**Best Management Practices – Category and Purpose** 

**Housekeeping Practices** – Maintenance of orderly work environment and contributes to overall facility pollution control environment.

**Spill Prevention Control and Countermeasures (SPCC) Plan** – Covers prevention of fuel and other hazardous material spills. Lists what steps to take if a spill occurs. Also covers spills of concrete and hazardous liquids off site from mixer truck or other equipment.

**Storm Water/Process Water Management** – Covers handling, treatment and discharge of storm water and process water under applicable permits. Attempts to control the amount of storm water that contacts process water and becomes contaminated.

**Preventative Maintenance Programs** – Well-maintained equipment is less likely to cause environmental damage. Specifies how regular maintenance programs should address environmental issues.



**Admixture Management** – Inspection and maintenance of admixture storage facilities for leaks or discharges.

**Sediment and Erosion Control** – Part of the storm water management process, prevents erosion of soils which may combine with storm water and create environmental impacts.

**Inspection and Record-keeping** – Lists how often inspection of facilities should be made for compliance with environmental plans and what records should be maintained.

**Site Security** – Prevents unauthorized entry of persons onto facility who might cause environmental damage (example – opening fuel storage tank valves).

**Employee Training** – Education of personnel on environmental policies and procedures, emergency plans and providing feedback for plan improvements.

#### **Acids and Alkalines**

There are a number of ways that a chemical or substance is measured to see if it will harm the

environment or harm people, animal, plant and aquatic life. One of the chemical measures commonly used in the ready mixed concrete industry is "pH". The pH of a substance is a chemical measure of how acidic or alkaline it is. The range of pH is from 0 to 14. Substances with a pH between 0 and 7 are acidic, 7 are considered neutral, and between 8 and 14 are alkaline, or "basic".

Many of the substances we come into contact with every day are either acidic or alkaline. For example, orange juice has a pH of about 4, and an antacid for an upset stomach has a pH of about 12. A high or low pH is not necessarily harmful, but most environmental regulations require any discharge from a plant or industrial site to have a pH between 6 and 9. The farther away from neutral (pH of 7) a chemical gets, either acidic or alkaline, the more damaging it can be to streams, rivers or ground water.

The hydration of Portland cement with water is a chemical reaction. This chemical reaction creates heat and also creates a high pH in concrete, making concrete a highly alkaline substance. The pH of concrete and concrete wash water can be 12 or higher. This high pH can cause skin irritation, and in some cases severe cement burns.

Many chemicals commonly used in the ready mixed concrete industry are acidic. Chemicals used for cleaning trucks and battery electrolytes are two examples (See Figure 2-3). Most industrial chemicals that are acidic will cause damage to the environment, if not controlled properly.



Figure 2-3: Acid is used to prepare dilute acid rinse solutions for periodic exterior drum cleaning.



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## Chapter 2 - Water & Solids Management

**Chapter Objectives** 

#### After studying this chapter, the CDP candidate should be able to:

- Recognize how process water and storm water are generated, and methods used to conserve or recycle them;
- List proper guidelines for truck cleaning at the plant;
- List methods of managing returned concrete;
- List proper jobsite washout procedures.

Water in Concrete Manufacturing



Figure 2-4: The CDP should take care not to overflow the water tank.

Concrete cannot be produced without water. Water is both an ingredient and a necessary material in the production of ready mixed concrete. Besides using water as a raw material, it is also needed for heating and cooling aggregates, dust suppression, and cleaning equipment (See Figure 2-4).

## *There are three categories of water used in environmental discussions:*

Process water
Storm water
Fresh water

Process water any water that comes into contact with cement, solvents, oil or other potential pollutants is considered process water. This includes any water that is used to wash out or flush mixer drums, and water used to clean the hopper and chutes of a truck mixer after loading (See Figure 2-5). Any water that comes into contact with Portland cement or concrete can have a pH of 12 or higher. Concrete process water may be considered a hazardous discharge by some environmental standards, if allowed to run off the plant or job site without appropriate treatment. Various provincial, regional and local legislations regulate how process water can be stored and handled on an industrial site.

It is advisable to limit the amount of process water any facility produces, since it is expensive to treat and handle. Process water can be reclaimed and recycled for use for use in concrete reclaimers, yard washing, aggregate washing, and as batch water in fresh concrete.



Figure 2-5: After loading, the CDP should rinse the mixer only in designated areas.



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#### **Storm Water**

Any rain or snow that falls on the plant site is considered storm water. Water that runs on the property from the manufacturing process but does not actually come into contact with is also process considered storm water (See Figure 2-6).



Figure 2-6:

Storm water retention ponds are used to gather all non-processed water.

An example would be the water spill created by overfilling truck water tanks.

Depending on the province, region or municipality, companies are required to have storm water management strategies as well as permits, to discharge any storm water off the site. Storm water is regulated because it can carry a high amount of dirt and silt, which can clog up drains and bodies of water.

#### **Fresh Water**

Water that comes from a clean source, such as a well or municipal waterline, and that has not come into contact with pollutants or manufacturing is considered fresh water. Most water used for concrete production must be "potable", or safe to drink. Water that has been treated or recycled from process or storm water, and which meets specific chemical requirements, may also be considered fresh water. Recycling water from storm water can be a fairly easy and inexpensive process.

#### Water Management

### It is essential to a good environmental management plan that these different types of water be controlled properly and conserved wherever possible.

- Fresh water should be used only as required and not allowed to become unnecessary process water or storm water. Besides the expense of getting fresh water, allowing it to become contaminated and turned into process water or storm water will increase the cost of managing it.
- Process water must be controlled and not allowed to run off the property to contaminate water or soil. Process water must be kept to a minimum since it is the most expensive to treat and handle correctly.
- Storm water must be controlled so it does not come into contact with processes and then become reclassified as process water.



#### How to Conserve Water

### *Here are a few ways that water can be conserved in a ready mixed concrete operation:*

- Do not allow water to run over when filling truck water tanks. Stay with the truck mixer and shut off water hoses before the water spills over.
- Do not use large diameter hoses for truck washing. Small diameter wash hoses are usually adequate, unless there is a water flow or pressure problem.
- Use as little water as practical to clean trucks and plants. Any chemicals used during the cleaning process will contaminate the water, potentially turn it into process water, and may make it hazardous. Truck cleaning should be done in specific areas at the plant or maintenance facility, where runoff water or chemicals can be properly captured and controlled.
- Use recycled water rather than fresh water wherever possible in:
  - Plant and yard wash downs
  - Slump adjustment
  - Aggregate sprinklers
  - Plant and truck washing
  - Batch water in concrete.

#### Truck Mixer Washout Procedures

Too much water can actually interfere with good drum cleaning. The small amount of concrete slurry remaining in the mixer drum at the end of the day can be used to help scrub the fins and drum. This scrubbing action tends to work best with approximately 550 to 750 litres of water. A larger volume of water in the drum will dampen the tumbling action and soften the intensity of the scrubbing that cleans the drum shell and blades, as well as generate additional process water.

The CDP may have to follow different procedures if the truck mixer has been carrying concrete with high cement content, low slump, small gravel, silica fume, certain admixtures, and old or hot concrete. These mixes may be sticky and harder to clean out. In these circumstances, ask the plant operator to batch about 500 kilograms of the largest aggregate available into the truck mixer drum. Crushed stone usually cleans better than rounded gravel, if there is a choice. Add 500 litres of water and run the mixer for approximately 10 minutes at mixing speed. Discharge the aggregate and slurry in the appropriate place, and rinse the truck mixer as for ordinary concrete.

#### Solids Management and Returned Concrete

Most of the solids that are created in a ready mixed concrete operation come from returned concrete or the residue from truck mixer drum washouts. Drum washouts will clean hundreds of pounds of concrete from the drum walls and fins, resulting in a slurry of cement water and aggregates. This water is considered process water, and has a very high pH. Approximately 550 to 750 litres of water is used each day to flush-out a mixer drum at the end of a shift. A fleet of 50 mixers can generate almost 11 million gallons of mixer flush-out process water each year!



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Solids Management and Returned Concrete continued

Figure 2-7: Hydration Stabilizing Admixtures (HSA) can be used to suspend the hydration process of the cement portion of the mix, allowing reuse of rinse water and returned concrete.



with returned concrete is to make concrete blocks for retaining walls.

### There are a number of methods to handle returned concrete and mixer drum washout water. Many producers use several of these methods in combination:

If returned concrete is not older than specifications allow, fresh materials can be added and the concrete can be shipped to another customer, depending on the producer's quality control guidelines. This requires a good estimate of how much returned concrete is left in the truck mixer, the type of mix and how long it has been batched.

Some companies use special hydration control admixtures (HCA's) to stabilize leftover concrete before adding new concrete to it for reshipping (See Figure 2-7). The returned concrete and HCA can stay in the truck for several hours or even overnight. This method requires accurate calculations. HCA dosage rates depend on detailed information including the concrete quantity, how old it is, its temperature, the mix design and how long it will be retained in the truck mixer.

Returned concrete may be used to make concrete blocks or other shapes. These large blocks can be used around the plant, or sold for special applications. Forms for these blocks are usually kept ready to accept returned concrete in half-metre or one-metre increments (See Figure 2-8).

Returned concrete can be used to pave driveway or parking areas as long as it is airentrained. Besides using the returned concrete, paved areas are easier to keep clean and can be constructed to channel runoff water into the proper areas. This will help in the overall environmental conservation efforts of the producer.



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Solids Management and Returned Concrete continued

- Mechanical reclaiming systems can separate aggregates from the cement water slurry, allowing each to be individually recycled (See Figure 2-9). Reclaimed coarse and fine aggregate can be reused in fresh concrete, as fill material on construction sites or as sub-base under paving. Cement slurry can also be used in fresh concrete under certain circumstances, or in flowable fill. Reclaiming and slurry systems have a high initial cost, can be expensive to maintain, and are difficult to use in winter conditions unless enclosed. However, this can be offset by disposal and other costs.
- Discharging returned concrete directly onto the ground is a fairly common option. The material is usually dumped in long narrow strips, so that it can be easily broken up by a front-end loader. Hardened leftover concrete is often crushed for sale as an economical construction base material.
- Special holding and settling ponds can be used to reclaim solids from returned concrete. The concrete slurry is discharged into holding areas, and the water is allowed to evaporate or run off the top into another settling pit. The solids are dredged out with a front-end loader after settling out, and the water can be treated and used as recycled water or discharged (See Figure 2-10).



Figure 2-9: Concrete recycling plant at Aggregate Industries, Glen Burnie, Maryland.



Figure 2-10: The clarified water from these settling ponds is reused for concrete production

The producer may have special policies and procedures for dealing with returned concrete that contains fibres, dyes, lightweight aggregate or other special products. These types of returned concrete may have to be handled differently.



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#### **Proper Jobsite Washout Procedures**

Washout procedures and disposal of leftover concrete at the construction site is an important part of the CDP's environmental responsibilities. The customer is responsible for providing a washout area, but the CDP is responsible to make sure the area will not violate environmental regulations. This can be a problem, especially for COD customers who have little experience with the construction process.

Usually the customer designates a place for truck mixers to wash out. This area should contain the residual concrete and wash water until it dries, and is then cleaned up by the customer. The area designated by the customer should keep all water and washout materials on the site and NOT allow it to run into a sewer catch basin, stream or creek, onto the roadway, or onto a neighbouring property. Discharging concrete or concrete wash water into a stream or other waterway that could be a possible fish habitat is a criminal violation of the federal Fisheries Act! (See Figure 2-11: disposal by rinsing chutes into a washout box).



In many cases, the washout area is a pile of fill or other debris that will be used elsewhere on the jobsite after the pour is completed. Sometimes the CDP will be required to discharge washout into a wheelbarrow or buggy, and the customer then takes responsibility for disposing of the wash water properly. Washout boxes are commonly used for commercial sites. These can be plastic lined wood boxes containing water and concrete slurry from the washing of truck mixer chutes. The contractor is responsible for disposing of the material collected in the washout boxes.



Figure 2-12: Chute closure devices are used to keep dripping concrete on the truck until it returns to the plant (courtesy Foram Inc.

Limit onsite washing to the chute and rear fins of the mixer. The CDP should normally be able to complete jobsite washouts using no more than 50 litres of water. Surplus concrete disposal and the flushing out of mixer drums should only be done at the proper areas back at the plant.

In situations where jobsite washout is not permitted or available, chute closure devices can be used to keep dripping concrete or wash water on the truck until it returns to the plant. These are usually bags with elastic closures that can be fitted on the back of the main and foldover chute, or a plastic device handle that acts like a with a valve to close the back of the chutes off. Some producers are using truckmounted self-contained washout systems, which stores all washout products on the truck for reuse or disposal at the plant.

If the CDP has any question about a washout site provided by the customer, he or she should determine the specific problem with the site and discuss it with the customer. If the CDP still feels the washout site is inappropriate or will violate environmental regulations, a dispatcher or producer's representative should be notified immediately.



## Chapter 3 - Admixture, Chemical & Fuel Management

**Chapter Objectives** 

#### After studying this chapter, the CDP candidate should be able to:

- Be familiar with proper chemical storage methods, and the elements of a Spill Prevention, Control, and Countermeasures Plan.
- Recognize sources of potentially hazardous liquids on truck mixers.
- Understand proper truck fueling procedures.

#### **Spill Prevention and Control**

Each producer should have a plan in place to address spill incidents at the plant, on the job site or in transit. The plan should address proper handling and storage of chemicals at the facility, disposal of waste, training of personnel, and spill response procedures. It will also list which government agencies must be notified of a spill, if required. Materials covered by these plans include fuels, admixtures, lubricants and solvents, cleaning agents, acids and other shop chemicals. Spills of concrete and discharges of truck fuel or oil on the roadway or jobsite should also be covered in the plan.

Fuel for equipment is the single largest quantity of hazardous material stored on most concrete plant sites. Fuel is stored in either underground or above ground tanks. Underground fuel storage tanks are required to meet strict standards for leak detection, overfill prevention and corrosion protection. Many producers have chosen to use above ground storage tanks or an offsite fuel supply to reduce the cost of compliance with fuel storage regulations. Above ground



Figure 2-13: These chemical admixtures are stored with special spill containment walls.

tanks are required to be double-walled or have containment provisions to hold the tank contents in the event of a leak or rupture. Tanks and containers that hold lubricants, solvents and other chemicals must be properly labelled, protected and inspected regularly for leaks. The CDP should always be alert for potential environmental problems at the plant site and notify the appropriate personnel if a problem is observed. Chemical admixtures for use in concrete should be stored in appropriate, well-labelled containers, with procedures to contain a small spill, should it occur. Most chemical admixtures are not considered hazardous, but must be stored and handled in such a way to minimize the danger of leaks or spills. Other chemicals

used in concrete, such as calcium chloride and color additives, may require special storage or handling procedures. The CDP should be aware of the environmental action and safety information that is contained in an (M)SDS form. Learn where they are kept on each plant site, and be familiar with the information on them. Know what to do and who to notify in the event of an environmental emergency (See Figure 2-13).



Truck Mixer Fluids

There are several fluids carried on truck mixers as part of the various operating systems such as the engine or transmission. These fluids may be considered environmentally hazardous if they leak or are spilled. They are:

- Oil from the engine or transmission
- Gasoline/Diesel fuel from the truck fuel tank and lines
- Antifreeze/water mixture from the engine cooling systems
- Hydraulic fluid from the brake and mixer systems.

Acids used for mixer cleaning should **never** be carried on the truck! This practice is illegal, since acid is considered a hazardous material, and truck mixers cannot legally carry hazardous materials. Any cleaning with acids should be done in an appropriate place at the plant site or garage.

#### Truck Mixer Spill Control

Concrete spills usually occur when high slump concrete or flowable fill is carried, or when truck mixer drums are not kept clean and a normal load cannot fit into the drum. On occasion, mixer controls can accidentally be put into discharge before leaving the plant or while on the roadway. Concrete that spills onto a roadway is not usually considered hazardous, but can damage the company's reputation and create a traffic hazard. A CDP who observes concrete discharging from the drum should notify the dispatcher or maintenance yard immediately so that it can be promptly cleaned up. The truck should be stopped, and the rear of the mixer cleaned so that no additional concrete material or aggregate can fly off the truck.

The CDP should always be looking for potential leaks or spills as part of truck mixer inspection procedures. Fuel tanks and caps, hoses, fittings and lines should all be regularly inspected for wear, leaks or spills. Any leaking component, or potential leak, should be written up and repaired promptly to avoid environmental impacts. This is not always practical with older units that may leak engine oil or hydraulic fluid on a regular basis. The CDP should be aware of these leaks while operating the unit, and should carry extra quantities of absorbent materials to keep such leaks under control.

#### **Spill Kits**

Although a well-trained CDP is always on the lookout for jobsite conditions that could damage the truck mixer, accidents can occur. Obstacles such as tree branches can rip off fuel or oil lines, and radiators or fuel tanks may be punctured by steel rebar. Many companies provide spill kits for each truck, which will handle small spills of fluids from a truck mixer. These kits can be ordered from commercial suppliers, or individually made up by the concrete producer.



Spill Kits continued

#### Spill kits will usually contain the following items:

- A watertight case for kit storage
- Rubber gloves to protect the CDP from exposure to leaking fluids
- Socks filled with absorbent materials to create dams so fluids cannot run off
- Granular absorbent such as speedy-dry, or pad-type absorbent materials
- Cell absorbents for use to soak up fluids on top of still water
- Large material bags and zip-ties to dispose of items used in cleanup
- Set of tapered wooden wedges that are used to close leaks
- Putty sealant for small leaks in fuel tanks or radiators

#### Truck Mixer Spills

## In the event of a spill on the road or jobsite from a truck mixer, these are the main priorities:

1<sup>st</sup> - CDP personal and vehicle safety, and the safety of other people who may be involved

2<sup>nd</sup> - Minimizing harmful impact on environment

Here is a method to remember what steps to take in event of spill from a truck mixer, called the SUCCESS method (courtesy of Morse Bros., Oregon):

- **S** = Safely secure the vehicle first
- **U** = Understand the situation, get the big picture
- **C** = Contain the spill immediately
- **C** = Cut off the leak at the source
- **E** = Evaluate what is needed to finish
- **S** = Soak up all remaining fluids
- **S** = Stock up truck/equipment with new or restocked spill kit



**Truck Mixer Fueling Procedures** 

Figure 2-14: Fueling station at Bardon Trimount plant, Saugus, Massachusetts.



Fuel that spills during truck fueling operations is a potential source of environmental contamination, but one that is very easily prevented.

## In order to minimize the danger of fuel spills, the CDP should observe the following:

- Always stay with the truck mixer during fueling. If the truck is left unattended during fueling, there is no one available to stop a fuel spill from occurring (See Figure 2-14).
- Do not release the nozzle unless the pump has an automatic cutoff device, and there is no danger that the nozzle will fall out of the tank. The CDP may perform other functions such as checking tires or cleaning mirrors, but should not let the fuel nozzle out of his or her sight. Automatic shut-off devices can sometimes malfunction, and fuel may be spilled.
- If the fuel nozzle does not have an automatic shutoff, do not prop it open with a rock or other device, so that it stays on constantly.
- Properly record fuel used, or meter readings, on the appropriate paperwork, if required.
- Fuel areas should be constructed to allow easy cleanup and prevent fuel spills of any quantity from running out of the area. If fuel is spilled, clean it up promptly, according to the company SPCC, or notify the appropriate maintenance personnel.



## Chapter 4 - Other Environmental Issues

**Chapter Objectives** 

#### After studying this chapter, the CDP candidate should be able to:

Recognize the value of plant and truck aesthetics.
Understand sources of air emissions and how they are controlled.
Recognize noise pollution sources and ways to control them.

#### Remember what your mother told you...

Everyone's mother always told him or her that being clean is a sign of good things. Mother's advice also applies to ready mixed concrete operations. Housekeeping can seem like a tedious and boring job with little value. There never seems to be enough time to clean the yard, wash trucks, mow the lawn or pick up garbage. Usually these things get done on a rainy day or between loads and are considered a low priority, but these are important tasks in a comprehensive environmental program.

#### Plant Appearance

A clean, attractive plant projects a positive image to the neighbours and gives employees something to take pride in. Regular trash pick-up, painting and lawn mowing can make an enormous difference. Things like attractive signs, landscaping and green space, a safe and clean entranceway, and the appearance of the plant and grounds themselves speak volumes about the company's of commitment level to the environment and the community. Developing a plan to improve plant appearance, which can be accomplished over time, can pay off through increased employee morale, fewer problems with the neighbours, and recognition of the facility by the community as a good corporate citizen (See Figure 2-15).



Figure 2-15: NRMCA Environmental Award winning plant, Newington Concrete, Newington, VA.



#### Truck Mixer Appearance

Keeping the truck mixer clean is nothing new for the Concrete Delivery Professional. From the first day on the job, every trainee has been told that keeping the truck mixer clean is one of



Figure 2-16: NRMCA Fleet Graphics Award winner, Consumers Concrete Corp., Kalamazoo, MI

the most important tasks they have. This is for several very good reasons. The ready mixed concrete truck is a rolling billboard and advertisement for the concrete producer. Many people see the truck on a daily appearance basis. Its tells customers and the public how much the producer cares about its image, the public safety, and commitment to the environment. People see a dirty truck and believe that the producer does not care about cleanliness or being a good corporate citizen. The CDP can influence the public's perception of the concrete producer by spending much time as possible as cleaning the mixer truck. Just as preventative maintenance keeps

a truck from a critical breakdown, keeping the mixer truck clean on a daily basis prevents hours spent in chipping or using acid on the truck. It will extend the life of the unit, cut down on expensive repairs and save the producer money. A clean and well-kept truck mixer is also a source of pride for the CDP, who can show his or her commitment to the environment through its appearance (See Figure 2-16).

#### Air Quality and Emissions

Air pollution, especially dust, from concrete plants is a common source of citizen complaints and environmental concerns. Air pollution makes up a large portion of the world's environmental problems. Point sources and fugitive sources make up the majority of air emissions, many of which are regulated through provincial legislation.



Figure 2-17: Plant worker inspects baghouse used to capture cement dust.



Air Quality and Emissions *continued* 

A point source comes from a specific location such as silo bag houses, cement tanker relief valves, exhaust stacks, or aggregate weigh batchers. Provincial legislations regulating point source emissions often require permits and mechanical devices to reduce air pollution, and must be in operation whenever the plant is running. They do an excellent job of dust suppression, when properly installed, regularly inspected and well maintained. Point sources not requiring permits can be controlled through good environmental practices, such as minimizing the air pressure and speed of cement unloading (See Figure 2-17).

Another example of point source air emissions is exhaust pipes from automobiles or truck mixers. Although federal regulations on auto and truck emissions have cut down a large portion of air pollution, the millions of vehicles that operate in this country create significant impact on the environment. The CDP should minimize the idling of truck mixer engines whenever possible. This will also create less wear and tear on the engine.

Fugitive sources have no specific source and come from larger areas, such as aggregate stockpiles or roadway dust. Fugitive sources of air pollution can usually be controlled by simple good housekeeping practices. One of the most effective ways to cut down on fugitive dust is regular sweeping or washing of paved roadways. Paved roadways are easier to clean and maintain, provide less wear and tear on equipment, and are a good use for surplus concrete!

Recycled water can be used to control fugitive dust. Water used for fugitive dust control must be then collected so runoff is prevented. This is usually done as part of the storm water control plan.

#### Other methods of controlling fugitive dust include:

- Clean up spilled materials so they do not become a windblown dust source.
- Use bunkers, ground hoppers or covered conveyors in aggregate storage and handling to contain dust.
- Use sprinklers on aggregate piles, conveyors and roadways to prevent dust from blowing off piles.
- Reduce onsite speed limits to minimize dust being thrown into the air.



MODULE II - ENVIRONMENTAL

**Noise Pollution** 

Most people don't think of noise as a form of pollution, but excessive noise can disrupt the environment. Noise sources can intrude on other people's lives and disrupt animal or wildlife behaviour. Neighbours around a ready mixed concrete plant will often complain about noise from concrete plants or truck operations, particularly if a plant is operating at night or on weekends. Noise can echo and travel several miles from the source if conditions are right.

Environmental noise is primarily the jurisdiction of provincial governments, however many local municipalities have noise ordinances or regulations that limit hours of operation for a manufacturing facility because of noise concerns. Occupational health and safety legislation regulates noise in terms of personal safety and hearing conservation. It is measured in decibels (db). Some of the equipment used in concrete production, such as aggregate hopper vibrators, chipping hammers and cement blowers can have noise intensity levels higher than 100 db. These high noise levels can disturb nearby residents and damage hearing of employees without proper hearing protection and exposure control. Operation of any equipment that creates high noise levels should always be done knowing whether it will affect neighbours or other businesses off site.

The CDP should make every effort to control truck noise, especially at concrete plants near residential areas.

#### Here are some ways to reduce truck noise:

- Lock and secure all chutes so they do not rattle or bang.
- Reduce speed in yard to prevent banging of mixer or chassis.
- Do not rev engines excessively or use air horns unless necessary.
- Maneuver trucks to minimize backing up, which will decrease the use of back-up alarms.



**Review Workbook** 

#### Introduction

Each module contains short review workbook that is designed to help you study for the CDP certification exam. You can use each Module's workbook to learn key concepts that will be on the exam, and then as your study guide for the exam itself.

We have organized each Module's set of review questions in chronological order by section. The section title on the left refers to the section in the module where this information is covered. Fill in the blank for each question and then check your answers at the end of each Module's Review Workbook.

Key concepts in this workbook may be on the test. If you can't answer a fill-in-the-blank question, read that section in the chapter again. Not all the material on the CDP certification exam is in this workbook so remember to read all five Study Guide Modules carefully for additional important topics you might find on the exam.

Good Luck!



#### Module II - Chapter 1: Environmental Awareness

SECTION TITLE	QUESTION
Environmental Regulations	1. An (M)SDS sheet lists
	andinformation on
	specific chemicals in the workplace.
Environmental Management Plans	2. Ais used to develop environmental compliance using the best
	Possible method for a plant location.
Acids and Alkalines	3. The pH of a liquid is a measure of how
	orit is.
Acids and Alkalines	4. A pH level of 12 is considered

Module II - Chapter 2: Water and Solids Management

SECTION TITLE	QUESTION
Process Water	1. Any water that comes into contact with
	cement, fresh concrete or used to wash out
	mixer drums is considered
	water.
Storm Water	2. Clean water that spills over while filling water
	tanks is considered
	water.
Storm Water	3. Companies are required by the EPA to have
	a if water is allowed
	to run off the plant site.
Proper Jobsite Washout Procedures	4. Jobsite washout should not be done in the
	street, or where it can run into a
	or



Module II - Chapter 3: Admixture, Chemical and Fuel Management

SECTION TITLE	QUESTION
Spill Prevention and Control	1. The will list the steps
	necessary to contain and control any environ-
	mental spill or accident.
Truck Mixer Spill Control	2. The CDP should always be looking for potential
	or
	as part of truck mixer inspection procedures.
Truck Mixer Spills	3. If a truck develops a fluid leak while on the
	job, the CDP should use a
	to contain the spilled liquid.
Truck Mixer Fueling Procedures	4. During fueling, the CDP should never leave
	the nozzle unattended even if using an
	shut-off nozzle.

Module II - Chapter 4: Other Environmental Issues

SECTION TITLE	QUESTION
Air Quality and Emissions	1. A air emission
	comes from a specific location, such as a
	truck exhaust stack.
Noise Pollution	2. The truck's
	should be used sparingly to avoid creating
	excess noise, especially in residential areas.



MODULE II - ENVIRONMENTAL

# **Review Workbook Answers**

#### Chapter 1

- 1. environmental, safety
- 2. BMP
- 3. acid, alkaline
- 4. alkaline

#### Chapter 2

- 1. process
- 2. storm
- 3. permit
- 4. catch basin, creek

#### Chapter 3

- 1. SPCC
- 2. leaks, spills
- 3. spill kit
- 4. automatic

#### Chapter 4

- 1. point source
- 2. air horn

